

# De *Madrid* al *Cosmos*

Unitary dynamics selecting a  
quantization of the Dirac field in cosmology

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**Abstract:** It is well known that linear canonical transformations are not generally implemented as unitary operators in QFT. Such transformations include the dynamics that arises from linear field equations on the background spacetime. This evolution is specially relevant in nonstationary backgrounds, where there is no time-translational symmetry that can be exploited to select a quantum theory. We investigate whether it is possible to find a Fock representation for the canonical anticommutation relations of a Dirac field, propagating on a homogeneous and isotropic cosmological background, such that the field evolution is unitarily implementable. First, we restrict our attention to Fock representations that are invariant under the group of spatial isometries of the background. Then, we prove that there indeed exist Fock representations such that the dynamics is implementable as a unitary operator. Finally, once a convention for the notion of particles and antiparticles is set, we show that these representations are all unitarily equivalent.

Lunes 20 de junio, 16:00 h.  
Sala de Conferencias  
CFMAC-CSIC (Serrano, 121)

Ciclo de seminarios organizado conjuntamente por los grupos

- *Teorías Efectivas en Física Moderna* (UCM)
- *Gravitación y Cosmología* (IEM-CSIC)

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